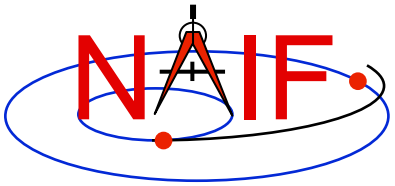


Navigation and Ancillary Information Facility

SPICE Development Plans and Possibilities

November 2014

Higher Fidelity Shape Models

Navigation and Ancillary Information Facility

- **Extension of the shape model subsystem**
  - Called Digital Shape Kernel (DSK)
  - Add two new shape model capabilities…
    - » tessellated plate model, for small, irregularly shaped bodies
    - » digital elevation model

    to the existing tri-axial shape model found in PCK

  - Status
    - » An alpha-test prototype of the plate model has been given to several projects and persons
      - Date for release of a "final" version has not yet been set
    - » Work on an alpha-test of the digital elevation model is ongoing
      - Date for release of a "final" version has not yet been set

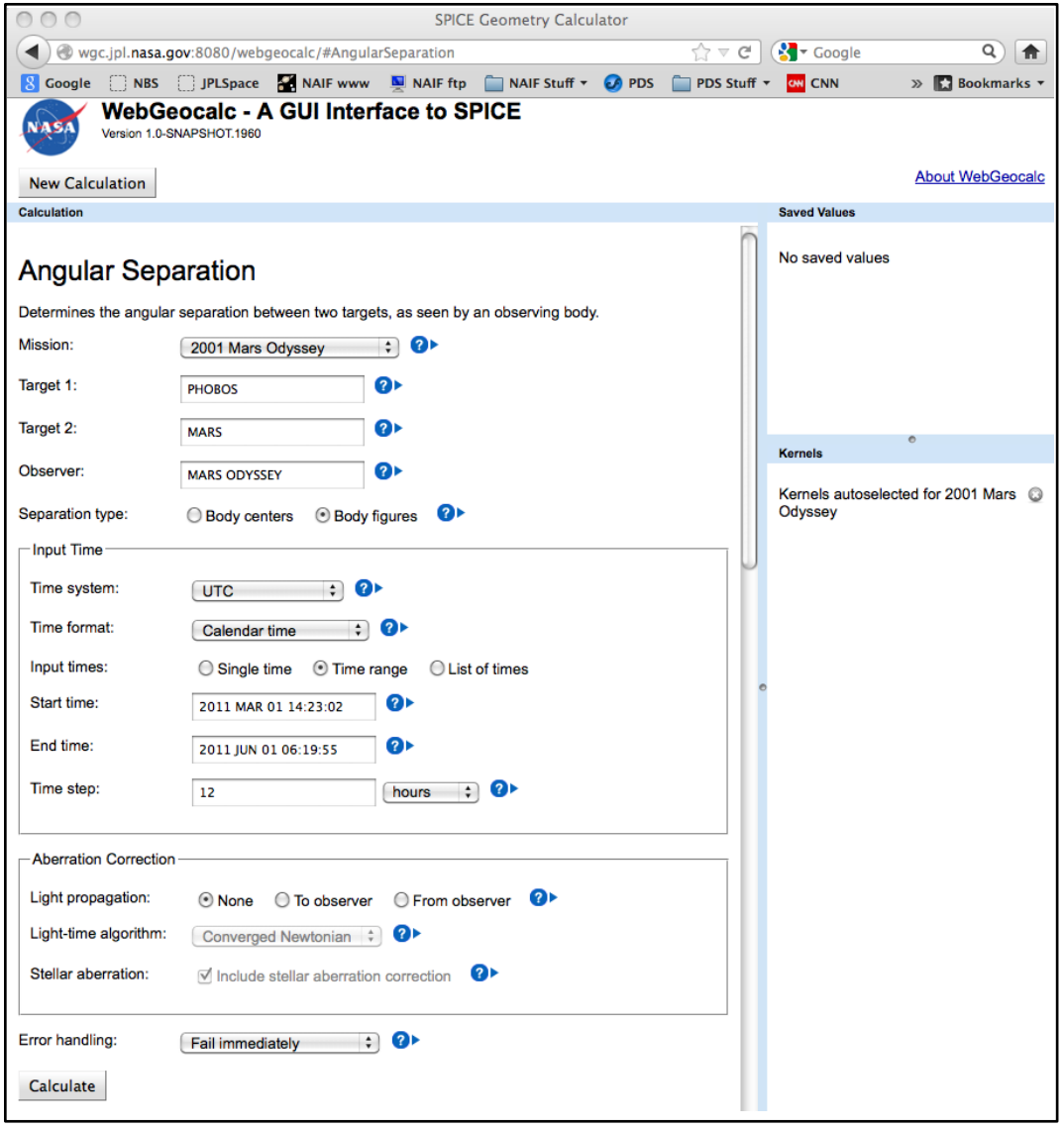
"WebGeocalc"

Navigation and Ancillary Information Facility

- NAIF is implementing a client-server GUI interface to a SPICE geometry engine
- All you need is a standard browser—it connects to a server holding a SPICE-based geometry engine and a large set of SPICE kernels
- How might this be useful to you?
  - Check your own SPICE-based code under development
  - Obtain a quick back-of-the-envelope calculation
  - Diagnose geometry problems
  - Opens SPICE capabilities to non-programmers
- Version 1.0 was released November 2013
- A slightly more capable version should be released during Fall 2014
- A programmatic interface to WGC will be added in FY15
- See the next two pages for visuals

WebGeocalc – Input Page

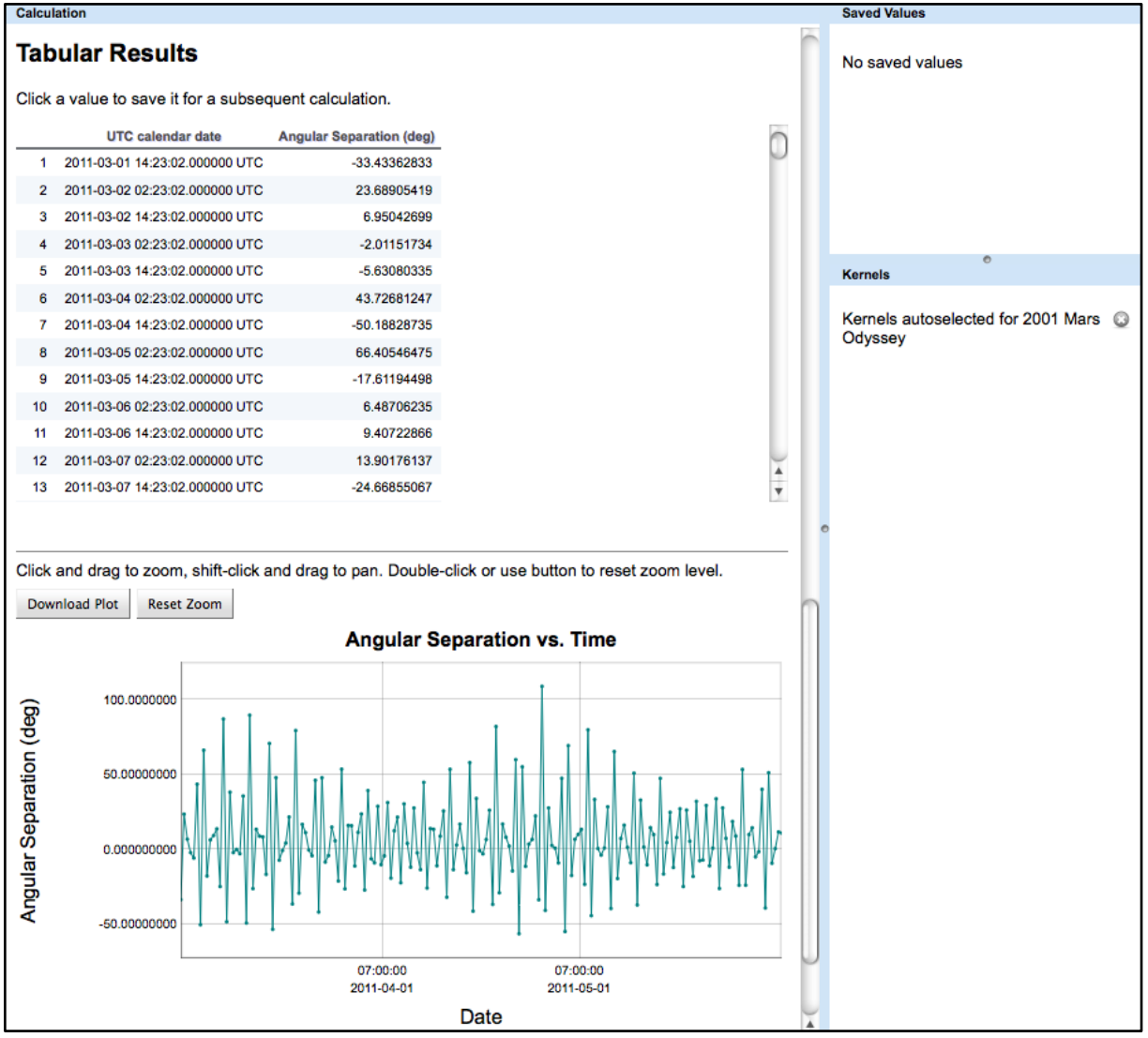
Navigation and Ancillary Information Facility



Example: compute the angular separation of Phobos and Mars as seen from the Mars Odyssey spacecraft during the period from Mar 01 to June 01, 2011, using a 12 hour time step.

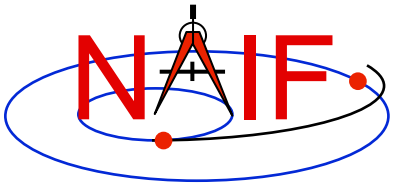
WebGeocalc – Results Page

Navigation and Ancillary Information Facility



Angular separation of Phobos from Mars as seen from the Odyssey spacecraft.

Both numeric and graphic results are provided.



More API Interfaces

- **Java Native Interface (JNISpice)**
  - An alpha-test release was made in February, 2010
  - Date for official addition to the Toolkit is TBD
- **Python**
  - Considerable prototyping has been done
  - When this effort will proceed is uncertain
    - » Some SPICE users have built their own (perhaps partial) version: check for these using “spice_discussion”

Some Other Possibilities

- More high-level computations, such as instrument footprint coverage
- More “geometry finder” computations
- Complete the star catalog subsystem started long ago
- Additional target models: rings, gravity, atmosphere, magnetosphere, …
- Develop a more flexible and extensible instrument modeling mechanism

What do You Suggest?

- **NAIF solicits suggestions from the user community.**
  - **Caution: we're a small team and have a large backlog, so we can't promise any particular action.**
- **We're interested in programmatic ideas as well as technical ones.**
  - **Should NAIF promote use of SPICE beyond NASA's planetary science program?**
  - **What amount of cooperation and interoperability with foreign partners is appropriate and achievable?**